

APPENDIX G

DATABASE ADMINISTRATION CONCEPTS

A. INTRODUCTION

1. In general, the role of database administration, like that of data administration, applies to many DoD organizations and projects and requires levels of database administration parallel to those of data administration. The requests for technical support for data access will flow from the application-specific to the enterprise-wide level, and the guidance and support will flow from the enterprise-wide to the application-specific level.

2. Database administration is concerned with the efficient use of the resources that hold and make available the data resources in assigned databases in an organization. Database administration controls and maintains the flow of data into, within, out of, and among various databases. It physically controls how, where, and in what manner, data is stored and maintained within each database.

3. The relationship between the data administration and database administration function is a mutually supportive one with the combined objective of building integrated “systems” of databases capable of sharing data across organizations’ functional boundaries. Data administration is a higher level conceptual or architectural discipline that is responsible for data, data structure, and integration of data with activity throughout the data and information systems life-cycle. Database administration, on the other hand, includes the physical design, development, implementation, security, and maintenance of physical databases built to support the logical design developed by the data administration activity. The data administrator provides each database administrator with the boundaries (domains) of a database structure developed from the logical model. While data administration is responsible for interpreting and enforcing information management policies for the enterprise as a whole, database administration is responsible for managing and carrying out those policies for individual databases.

B. POLICY

1. Database administration follows the standards and policies established by data administration, bringing problems and necessary changes to the attention of the FDA or CDA, and the AIS PM. Database administration policy also supports the Defense Information Management guiding principles specified in DoD Directive 8000.1 (reference (g)). A summary of the guiding principles that database administration will adhere to is provided below.

- a. Provide the best performance at the least cost for all users while

meeting functional and technological requirements.

b. Data will be controlled and managed throughout its life-cycle as a resource, in the same manner as capital, materiel, and people.

c. Databases will be designed, implemented, and maintained:

(1) Separately from information applications to enable shared and controlled access by multiple users.

(2) In an enterprise-wide strategy and in accordance with data life-cycle management practices defined in Appendix A in this Manual.

(3) Based on activity and data models that support improved functional practices and value of information.

(4) In accordance with DoD Directive 8000.1, (reference (g)) and DoD Directive 8120.1 (reference (b)).

d. Database products (e.g., schemas) will be maintained to facilitate maximum reuse and shareability throughout the Department of Defense.

e. Access to data will be facilitated, and/or controlled and limited, as required. Data will also be safeguarded against unintentional or unauthorized alteration, destruction, or disclosure.

C. DATABASE ADMINISTRATION ACTIVITIES

1. Database administration activities include providing technical support for physical database definition, design, implementation, maintenance, integrity, and security; enforcing the policies and standards established by the data administrator; coordinating with computer operations technicians, system developers, vendors, and users; and education of personnel to ensure competency. The AIS PM has the responsibility for program management and for ensuring that data administration policies and procedures are followed. The database administrator is oriented toward technical support for databases. Appropriate use of information technology resources is a major concern of the database administration activity. The following are major activities of the database administration activity:

a. Technical Support. The database administrator has the responsibility for the operational implementation of databases, from designing the physical databases and user views to guaranteeing the integrity and efficiency of the data access activities. This is the main activity of the database administrator. The database administrator shall:

(1) Provide technical advice and guidance for database integration

design tools, database access, logical and physical data structure evaluation, and database problem resolution (including recovery and performance issues).

(2) Provide technical assistance in the design of logical data models.

(3) Design and implement optimum physical database structures based on logical data model design and performance requirements. This includes the assessment of future growth via capacity planning.

(4) Promulgate technical standards, design rules, and conventions for databases.

(5) Monitor and maintain technical integrity of physical databases. Establish and promulgate restart and recovery procedures. Conduct continuing technology assessment.

(6) Monitor and analyze database performance on a continuing basis to maintain database efficiency.

(7) Participate in the development of DBMS evaluation criteria and the evaluation and testing of alternate technology solutions.

(8) Provide continuing evaluation and planning to:

(a) Take advantage of evolving technologies.

(b) Support system enhancement and modernization.

(c) Position data for transition (migration, gradual evolution, archival).

b. Enforcement of Policies. This includes security, access, data standardization, and configuration management policies. The database administrator works with the data administrator to provide the degree of protection commensurate with the security classification of the data and the authorization of the user; guarantees compliance with access control standards by establishing and monitoring file protection mechanisms; implements automated support to enforce data standards; and institutes procedures to track and document all changes to database-related items to support configuration management programs. The database administrator shall:

(1) Evaluate and implement database security packages, monitor database security, and provide control and access to databases in accordance with data stewardship guidelines for database configuration items.

(2) Enforce and execute data standardization and data life-cycle policies established by data administration.

cm **Coordination.** The database administrator coordinates all database-related issues with data administration, computer operations, technical development activities, and users. This includes implementing and maintaining and/or converting databases, assuring consistency with the logical data model, establishing procedures for the release of database schemas and subschemas to operational sites, and addressing technical questions and resolving technical problems. The AIS PM ensures that the coordination follows data administration policies and procedures.

d. **Education.** The database administrator establishes procedures that support the implementation, promulgation, and continuity of an effective education program, including formal training. The areas of database concepts, database design, effects of database operation, database standards, database usage, and high-level languages are addressed. The database administrator will also liaise and consult about proper database practices with management, technical development activities, AIS PMs, users, and other involved personnel. The database administrator shall provide training in proper database practices to these people.